

Placing Emergency Department Crowding on the Decision Agenda

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You crash your car and need immediate emergency care. The closest level 1 trauma center is closed. Your ambulance is diverted to an open ED, farther away. Your odds of survival diminish as the seconds... minutes tick by.

You are an emergency nurse. Your assignment is to care for a patient with a myocardial infarction until an intensive care unit (ICU) bed can be found, for a trauma patient, and for a patient in the hallway with the gunshot wound to his leg awaiting surgery. Another ambulance with a patient in respiratory distress has just arrived. Did you go into nursing to have many more patients than you can safely care for?

These dangerous situations are a result of emergency department crowding (EDC). EDC is a complex, serious problem with no easy solutions. This is a call for nurses to form coalitions with other disciplines to influence policy related to EDC at the hospital, community, and national levels. This is a call to the nursing profession to promote adding EDC to the decision agenda. The decision agenda is where an issue is about to be acted upon (Birkland, 2001). The purpose of this article is to provide nursing with a review of the available research and expert opinion on EDC causes, resolution efforts, and recommendations for future actions.

Definition

EDC is a "situation in which the demand for emergency services exceeds the ability of a department to provide quality care within acceptable time frames" (Canadian Association of Emergency Physicians and the National Emergency Nurses Affiliation, 2003, p. 3). EDC is occurring with alarming frequency. It has been reported in the

literature in the United States, United Kingdom, Australia, Canada, and Spain, demonstrating that this problem is not unique to the U.S. health care system.

In a 2001 American Hospital Association (AHA) Survey of emergency department and hospital capacity (The Lewin Group, 2002), 62% of the emergency departments reported being at or over operating capacity and one-third reported ambulance diversions. Sixty-one percent of the large hospitals reported overcapacity. All regions of the country reported overcapacity with the Northeast and West Coast reporting the highest percentages (The Lewin Group, 2002). A specialty study on EDC by the General Accounting Office (GAO, 2003) found 1 out of 10 hospitals was on diversion greater than 20% of the time. They also found that EDs in larger metropolitan areas had more diversion hours (GAO, 2003). Derlet, Richards, and Kravitz (2001) surveyed ED directors in 50 states and 91% of the 575 who responded reported EDC as a problem. The most important question is when does EDC result in negative patient outcomes?

Outcome studies

Derlet and Richards (2000) list eight effects of EDC: public safety risk (for example, poor patient outcomes), prolonged pain and suffering, dissatisfied patients, ambulance diversions, decreased physician productivity, violence, negative effect on teaching missions in academic medical centers, and miscommunication. While these effects seem plausible, there is little research quantifying the outcomes of EDC.

The Joint Commission on Accreditation of Healthcare Organizations' (JCAHO, 2003a) review of sentinel events has attributed patient deaths to delays in patient care. Delay in treatment is the most common type of sentinel event (46.2%) listed for hospital emergency departments. In a sentinel event alert JCAHO (2002) reported 55 cases of care delays, with 29 being ED related. In these ED cases the most common causes were staffing (34%), EDC (31%), and availability of physician specialists (21%). There were 52 patient deaths and EDC was cited in 31% of the cases (JCAHO, 2002). JCAHO (2003b) proposed a set of requirements to identify and mitigate situations that result in EDC.

EDC can contribute to increased trauma patient mortality when trauma centers are diverting ambulances.

Cornwell, Chang, Phillips, and Campbell (2003) reported improved trauma patient mortality and decreased diversion hours with a bundle of trauma center enhancements. A quantitative study (Miro et al., 1999) described an increase in patient mortality with EDC in Spain.

In the case of Joshua Fleuelling, an 18-year-old with a history of asthma who arrested at home and subsequently died after a delay in arrival of an advanced life-support ambulance crew and another delay as the nearest hospital was on critical care bypass, a jury made recommendations about asthma prevention, improvements in response of advanced life support, and resolution of EDC (Walker, 2002).

The majority of the information about negative outcomes is descriptive. Patients have expressed dissatisfaction with delays in treatment and delays in admission (Sun, Adams, & Burstin, 2001; Sun et al., 2000; Taylor, Wolfe, & Cameron, 2002). However, Sun et al. (2000) found that perception of wait time was more of a dissatisfier than actual length of stay or time waiting to be seen by a physician.

In a survey of ED directors of all 50 states, Derlet et al. (2001) reported delays in diagnosis and treatment (37%), a higher risk of poor outcomes (67%), and that a few patients had actual poor outcomes (33%). Schull, Morrison, Vermeulen, and Redelmeier (Canadian Association of Emergency Physicians and the National Emergency Nurses Affiliation, 2002; 2003) found that EDC resulted in increased transport times for patients with chest pain regardless of severity. A delay in receiving thrombolytic therapy could lead to a negative outcome.

Clark and Normile (2002) surveyed directors of emergency departments and critical care in six mid-Atlantic states and found a positive correlation between increased length of stay (LOS) and delays in implementing admission orders in the ED and missed tests or delays after admission to the critical care unit. Sixsmith and colleagues (2000) found that patients who boarded in the ED greater than 18 hours were more likely to have an extended hospital LOS of 0.7 to 1.1 days. Richardson (2002) found that patients who had an access block (ED LOS exceeds 8 hours) had an average inpatient LOS of 0.8 days longer than those patients without access block. This resulted in over 700 bed days per year. Neither study had enough information to determine the cause of the increased inpatient LOS. This provides a financial incentive to hospitals to decrease EDC and thus decrease overall hospital LOS.

Patient safety is at risk in overcrowded EDs because of the delays in provision of care, intensity of decision making, pressure to move patients quickly through the system, and providing care in less than desirable places such as hallways and waiting areas (Canadian Association of Emergency Physicians Working Group on the Future of Emergency Medicine in Canada, 2002). More quantitative studies are needed to quantify the impact of EDC on patient outcomes. Collecting data and sharing the negative outcomes can be used to capture the attention of policymakers to get EDC on the agenda (Birkland, 2001).

Focusing events such as the cases that have resulted in negative patient outcomes can also be used to increase the interest of policymakers in EDC (Birkland, 2001). Two examples of focusing events that have brought EDC into the public eye were Joshua Fleuelling's tragic death in Canada (Walker, 2002) and the sentinel events tracked by JCAHO (2002). Publicizing stories on the harms of EDC can lead policymakers to seek more information and solutions to EDC (Birkland, 2001).

Criteria for EDC

Emergency departments come in all shapes and sizes and emergency patients present with a myriad of conditions. How do nurses objectively identify when EDC is occurring? How is "busy" different from "crowded?" When does busy become crowded? How can nursing make EDC visible to administrators, researchers, and policymakers? There are no easy definitions or formulas to determine when an ED is overcrowded to an unsafe level. The American College of Emergency Physicians describes EDC as "A situation in which the identified need for emergency services, outstrips available resources in that ED. This situation occurs in hospital EDs, when there are more patients than staff, ED treatment beds and wait times exceed a reasonable period. Crowding typically involves patients being monitored in non-treatment areas and awaiting ED treatment beds or inpatient beds. Crowding may also involve an inability to appropriately triage patients, with large numbers of patients in the ED waiting area of any triage assessment category" (Crowding Resources, 2002, p.10). The GAO (2003) used diversion hours, boarding percentage for 2 hours or more, and number of patients who left before medical evaluation as indicators. Schneider, Gallery, Schafermeyer, and Zwemer

(2003) used number of patients compared to number of ED rooms, use of halls and non-clinical space for patient care, nurse/patient ratio, physician/patient ratio, number of patients who had been admitted, number waiting on a consultant, and ambulance diversion hours.

Causes

To identify effective interventions, causes of EDC must be understood. A list of causative factors identified in the research and expert opinion literature can be found in Table 1. Lack of inpatient beds was identified as the major cause of ED crowding. Patterns relate to either increased numbers of ED visits, prolongation of the ED evaluation and treatment process, or lack of another care area to transfer/discharge the patient to after receiving emergency treatment.

Indicators

What can be used to indicate and measure indicators of EDC? What factors point to unsafe care conditions in the emergency department? Reeder, Burleson, and Garrison (2003) suggest that charge nurse and attending physician perceptions of EDC, or when conditions are unsafe for patient care, are not reliable. Schull, Lazier, Vermeulen, Mawhinney, and Morrison (2003) also found some differences between attending physicians even when they have guidelines. A list of quantifiable indicators is found in Table 2. The most common indicator used to describe EDC was number of ambulance diversions. While it may be easy to capture the number of diversion hours, it is much more difficult to identify what conditions contribute to the need to go on divert. Studies have looked at a range of items from hospital occupancy and boarding hours, to nursing workload. Quantifying when the ED should go on divert is a challenge to do in real-time. Asplin, Rhodes, Crain, and Camargo (2002) found a relationship between ED occupancy and workload with ambulance diversions and a relationship between ED boarding burden, hospital census, and ED physician wait times with left without being seen. Brown (2002) found that left without treatment increased when a new policy was implemented to decrease diversion hours by allowing sicker patients to wait in the lobby.

TABLE 1
Causes of emergency department crowding

Causes	References
Increases in ED patient census	Derlet et al., 2001; Fatovich & Hirsch, 2003; Kyriacou et al., 1999; McManus, 2001; Reeder et al., 2002; The Lewin Group, 2002
Influenza outbreaks	Glaser et al., 2002
Lack of preventive care	Richardson et al., 2002
Slow throughput of patients	Estey et al., 2003
Nursing and staff shortages	Derlet & Richards, 2000; Estey et al., 2003; General Accounting Office, 2003; McManus, 2001; Richardson et al., 2002; The Lewin Group, 2002
High patient acuity	Derlet et al., 2001; General Accounting Office, 2003; Moroney, 2002; Reeder et al., 2002
Intensive treatment historically performed on inpatient unit	Derlet et al., 2001
Problems with language or cultural barriers	Derlet & Richards, 2000; Moroney, 2002
Medical record documentation requirements	Derlet & Richards, 2000
Unavailability of specialty consultation	Derlet & Richards, 2000; Estey et al., 2003; General Accounting Office, 2003; McManus, 2001
Delays in laboratory and radiographic studies	Derlet et al., 2001; Estey et al., 2003; General Accounting Office, 2003; McManus, 2001
Insufficient ED space	Derlet et al., 2001
Slow or incompatible information systems	Estey et al., 2003
Lack of inpatient beds	Curry et al., 2003; Derlet et al., 2001; Dunn, 2003; Estey et al., 2003; Forster et al., 2003; General Accounting Office, 2003; Kellermann, 2000; Kyriacou et al., 1999; McManus, 2001; Moroney, 2002; Proudlove et al., 2003; Richardson et al., 2002; Schull et al., 2003; Schull et al., 2001; The Lewin Group, 2002
Financial incentives to fill available beds with scheduled elective admissions	Derlet & Richards, 2000; General Accounting Office, 2003
Lack of funding for EMTALA mandated care	Richardson et al., 2002
Closure or decreased hours of other hospitals and community services	Fatovich & Hirsch, 2003; General Accounting Office, 2003
Shortage of community care (home care, sub-acute, long-term care)	Estey et al., 2003
Incentives to keep occupancy rates high	General Accounting Office, 2003

McManus (2001) found a relationship between hospital occupancy rates and ambulance diversion. McManus (2001) suggests that the current mechanism for measuring occupancy, measuring census at midnight, is inadequate as a true measure of occupancy. The lower volumes counted at midnight make it difficult to understand the nature of the diversion problem. Curry, Hall, and Schorn (2003) found a predictable increase in LOS for admitted ED patients as the hospital occupancy rate increased.

Queuing theory has been suggested by a number of authors (McManus, 2001; Proudlove, Gordon, & Boaden, 2003) as a mathematical strategy to help understand and

model strategies for ED crowding. Probabilistic models can be used to determine target occupancy levels and the number of empty beds that are needed to accommodate ED demand (Proudlove et al., 2003). Vasilakis (2001) used simulation modeling, queuing systems, and flow modeling to analyze an annual post-Christmas bed crisis and suspected that its cause was the halt of rehabilitation patient discharges over the holidays and staff on holiday leave versus bad weather, the flu, or the rise in elderly patients. Harper (2002) recommended a hospital capacity model that incorporates patient classification and takes

TABLE 2

Indicators of emergency department crowding

Indicators	References
Ambulance diversions	Asplin et al., 2002; Brown, 2002; Cameron et al., 2002; Fatovich & Hirsch, 2003; Schull et al., 2003; Schull et al., 2001
Left without being seen or left without evaluation or treatment	Asplin et al., 2002; Brown, 2002
ED volume	Asplin et al., 2002; Brown, 2002; Dunn, 2003; Schull et al., 2003
Number hours boarding admitted patients	Asplin et al., 2002; Cameron et al., 2002; Canadian Association of Emergency Physicians Working Group on the Future of Emergency Medicine in Canada, 2002; Dunn, 2003; Fatovich & Hirsch, 2003; Forster et al., 2003; Richardson, 2002; Schull et al., 2003
Staffed inpatient bed capacity/hospital occupancy	Asplin et al., 2002; Forster et al., 2003; Schull et al., 2001
Staff perception of EDC	Asplin et al., 2002
Reason for ambulance diversion	Fatovich & Hirsch, 2003
Number of ambulance arrivals	Schull et al., 2003
Arrival density index	Forster et al., 2003
ED acuity	Asplin et al., 2002; Richardson, 2002
Wait times to see ED physician	Asplin et al., 2002; Canadian Association of Emergency Physicians Working Group on the Future of Emergency Medicine in Canada, 2002; Dunn, 2003
Time to be seen by consultant/daily consultation rate	Canadian Association of Emergency Physicians Working Group on the Future of Emergency Medicine in Canada, 2002; Forster et al., 2003
Attending physician on duty	Schull et al., 2003
Number of ED nurse hours worked per interval	Schull et al., 2003
Nursing workload	Schull et al., 2003
Day of week	Schull et al., 2003
Shift/time of day	Fatovich & Hirsch, 2003; Schull et al., 2003
Mean assessment time (time patient registered to time admission order written)	Schull et al., 2003
Number of ED beds occupied by patients awaiting transfer to chronic care facility	Schull et al., 2003
Daily admission rate	Dunn, 2003; Forster et al., 2003
Return visits within 7 days from ED and hospital	Cardin et al., 2003
ED length of stay (LOS)	Brown, 2002; Cardin et al., 2003; Dunn, 2003; Richardson, 2002

complexity, uncertainty, variability, and limited resources into account.

Forster, Stiell, Wells, Lee, & van Walraven (2003) caution that studies may be limited to the data elements that are available, so there may be other indicators but they are difficult or too time consuming to measure. Computerization of the emergency department would assist in capturing quantifiable data that could be used to identify when EDC is occurring in the early stages so actions can be taken to prevent negative outcomes.

Models of care delivery

The GAO found that strategies to address EDC fell into two categories: increasing capacity and increasing efficiency (GAO, 2003). Bagust, Place, and Posnett (1999) suggested interventions in four categories to avoid or alleviate EDC: avoid admissions, develop alternatives to admission, become more efficient at managing existing resources, and facilitate early discharges. Asplin et al. (2003) developed an input-throughput-output conceptual model of EDC as

a practical framework for problem resolution. Input is described as “any condition, event or system characteristic that contributes to demand for ED services” (Asplin et al., 2003, p. 176). This includes patients seeking emergency care, unscheduled urgent care, and safety net care. Safety net care is when the ED is the only accessible provider for a vulnerable population such as the uninsured or Medicaid beneficiaries (Asplin et al., 2003). Throughput is about the time it takes to provide ED care. Examples of throughput would be turnaround times for being triaged, examined by a physician, for lab results and radiology exams. Output includes the factors that prevent timely disposition of patients. The patients’ ED care is completed but they are prevented from progressing to the next stage of care, such as being admitted to an inpatient bed or returned to a skilled nursing facility. This represents a whole host of factors ranging from the nursing and health care professional shortage to closure of inpatient beds.

In a review of articles from 1990 to 2002, Trzeciak and Rivers (2003) identified three causes of overcrowding which are congruent with the EDC model. Inadequate inpatient capacities, such as lack of inpatient beds or understaffed units, are an output cause of EDC. Higher severity of illness fits as an input condition, and hospital system restructuring, such as closure of EDs, affects input of other EDs.

Asplin’s model was used to sort the types of interventions found in the literature. These strategies are a combination of temporary interventions for use during acute periods such as the influenza season and ongoing strategies to prevent EDC. Table 3 contains the list of input, throughput, and output interventions from research and expert opinion. In addition, some authors suggested payment incentives such as improved reimbursement for lifesaving evaluations and treatment (Kellermann, 2000; Moroney, 2002), reimbursement for observation services (Moroney, 2002), and evaluation of the 3-day rule for acute hospital stay prior to placement in skilled nursing facilities (Moroney, 2002). Funding to evaluate new models of care was also suggested (Canadian Association of Emergency Physicians Working Group on the Future of Emergency Medicine in Canada, 2002). Kellermann (2000) recommended a basic level of health insurance for all citizens. Given that Canada, Australia, and the United Kingdom have this, and still have EDC, it appears that providing health insurance to all is not the only solution.

Another suggestion is for establishing a task force on EDC and ambulance diversion (Frank, 2001; GAO, 2003), national standards for delivering emergency services, and establishing performance indicators and benchmarks for monitoring of EDC (Canadian Association of Emergency Physicians Working Group on the Future of Emergency Medicine in Canada, 2002). The emphasis is on determining standards, identifying what to measure, and measuring effectiveness of these strategies through use of computerized systems in the prehospital and hospital setting.

Analysis of intervention research

While there are many strategies reported in the literature, there is a dearth of research on what strategies are effective in reducing EDC. Determining the cause and effect of relationships between administrative interventions is difficult because the interventions may overlap, may be implemented as a bundle rather than individually, and other changes may have occurred that affected results (Silka, Geiderman, & Kim, 2001). In Milwaukee the number of diversions in 2001 was less than the prior year after a number of interventions but cause and effect couldn’t be confirmed (Barthell et al., 2003). The GAO (2003) found only 1 hospital of the 24 visited had evaluated the affects of its activities, and none of the communities had completed an evaluation.

Throughput research

Cardin et al. (2003) found that increased emergency physician coverage, designation of physician coordinators, and new hospital policies regarding laboratory, consultation, and admission procedures reduced mean LOS for ED discharged patients from 13.8 to 5.9 hours.

Innes, Grafstein, Christenson, Purssel, and Stentstrom (2003) recommend installing computerized physician order entry (CPOE) to expedite patient care. In their study, LOS fell by 18 minutes for patients treated in the waiting room. The ED LOS rose by 12 minutes at the POE hospital and 36 minutes at the control hospital (Innes et al., 2003).

In a study using best demonstrated processes (Hoffenberg, Hill, & Houry, 2001), ED LOS was decreased with interventions such as assigning clear responsibility for tasks, setting performance expectations, and monitoring. The

TABLE 3

Categories of emergency department crowding interventions: input, throughput, and output

Input: strategies to control the number of patients arriving in the ED (Asplin et al., 2003)

- Development of uniform guidelines and definitions for types of diversion (Canadian Association of Emergency Physicians and the National Emergency Nurses Affiliation, 2003; General Accounting Office, 2003).
- Real-time patient load information available to EMS teams, ED directors, and hospital administrators (General Accounting Office, 2003; McManus, 2001).
- Permission to go on diversion must be obtained from hospital executive (Lagoe et al., 2003).
- Explore reimbursement strategies to support expansion of primary care clinics and after hour care (McManus, 2001).
- Extend hours of urgent care centers or clinics (Barthell et al., 2003; Estey et al., 2003).
- Referral to clinics for next day appointments (Grumbach et al., 1993; Washington et al., 2002).
- Influenza vaccination programs (Glaser et al., 2002).
- Referrals seen by general practitioner can be admitted without passing through the ED (Proudlove et al., 2003).
- Allow direct admits to floor for transfers from other facility (Canadian Association of Emergency Physicians and the National Emergency Nurses Affiliation, 2003).

Throughput: increasing efficiency of the ED (Asplin et al., 2003).

- Expand ED beds (Frank, 2001; General Accounting Office, 2003).
- Convert fast track or urgent care areas to care for patients with flu (Hospital Association of Southern California, 2002).
- Add additional cardiac monitors to ED beds (Lagoe et al., 2003).
- Implement standing orders (Lagoe et al., 2003).
- Use evidence based protocols (Proudlove et al., 2003).
- Provide on-call caregivers (Lagoe et al., 2003).
- Add additional physician coverage (Cameron et al., 2002; General Accounting Office, 2003).
- Establish consultation time frame standards (Canadian Association of Emergency Physicians and the National Emergency Nurses Affiliation, 2003).
- Plan vacation schedules to avoid staff shortages during flu season (Barthell et al., 2003; Hospital Association of Southern California, 2002).
- Flex nurse staff resources through use of nurses in administrative positions within reasonable limits of clinical competency (Hospital Association of Southern California, 2002).
- Petition the court system to excuse critically needed health care workers from jury duty (Hospital Association of Southern California, 2002).
- Increase availability of transporters (Estey et al., 2003; Lagoe et al., 2003).
- Add clerical staff (Cameron et al., 2002).
- Anticipate equipment and supply needs (Hospital Association of Southern California, 2002).
- Create hospital nursing culture where diversion is unacceptable (Lagoe et al., 2003).
- Assign physicians primary responsibility for ED discharge instructions (Kyriacou et al., 1999).
- Institute streamlined registration (General Accounting Office, 2003; Kyriacou et al., 1999).
- Decrease lab, radiology, and other diagnostic tests turnaround times (Canadian Association of Emergency Physicians and the National Emergency Nurses Affiliation, 2003; Estey et al., 2003; General Accounting Office, 2003; Proudlove et al., 2003).
- Use computer-assisted prescription writing to decrease clarification time by pharmacist and errors (Bizovi et al., 2002).
- Develop information systems to exchange patient information between community and the ED (Canadian Association of Emergency Physicians and the National Emergency Nurses Affiliation, 2003).
- Institute ED physician order entry (CPOE) (Innes et al., 2003).
- Implement full-time trauma service (Cornwell et al., 2003).
- Create overflow units or temporary sites (Frank, 2001).
- Create observation or clinical decision units (Cameron et al., 2002; Canadian Association of Emergency Physicians and the National Emergency Nurses Affiliation, 2003; Estey et al., 2003; Frank, 2001; Kelen et al., 2001; Proudlove et al., 2003).
- Create a fast track unit (General Accounting Office, 2003).
- Use physician assistant or nurse practitioner to care for boarding admitted patients (Ganapathy & Zwemer, 2003).

(Continued)

TABLE 3 (continued)

- Assign discharge coordinator to the ED (Canadian Association of Emergency Physicians and the National Emergency Nurses Affiliation, 2003).
 - Establish multidisciplinary ED-based teams to coordinate community support for patients who will not benefit from hospitalization (Canadian Association of Emergency Physicians and the National Emergency Nurses Affiliation, 2003).
- Output: these strategies primarily involve access to inpatient beds (Asplin et al., 2003)
- Assign top priority to emergency admissions (Canadian Association of Emergency Physicians and the National Emergency Nurses Affiliation, 2003).
 - Distribute admitted patients equally between all acute call areas including the ED (Canadian Association of Emergency Physicians and the National Emergency Nurses Affiliation, 2003).
 - Establish 30 minute rule for receiving units to take report from ED (Canadian Association of Emergency Physicians and the National Emergency Nurses Affiliation, 2003).
 - Provide bed manager a view of waiting patients with ED information system (Proudlove et al., 2003).
 - Assign patients to off-service beds when defined EDC level met (Canadian Association of Emergency Physicians and the National Emergency Nurses Affiliation, 2003).
 - Defer elective surgeries (Barthell et al., 2003; Glaser et al., 2002; Hospital Association of Southern California, 2002; Proudlove et al., 2003).
 - Establish admission units during peak hours (Canadian Association of Emergency Physicians and the National Emergency Nurses Affiliation, 2003).
 - Add telemetry beds (Lagoe et al., 2003).
 - Add additional ICU and medical surgical beds (Fatovich & Hirsch, 2003; Forster et al., 2003; Frank, 2001).
 - Add additional aged care beds/skilled care (Fatovich & Hirsch, 2003).
 - Close critical care units to primary care, only intensive care specialist can admit (Lagoe et al., 2003).
 - Encourage discharges of inpatients earlier in the day (General Accounting Office, 2003; Lagoe et al., 2003).
 - Conduct daily or twice a day bed meetings/summits/briefings (General Accounting Office, 2003).
 - Develop "Code Help ER or Code Purple." Mobilization of staff to expedite admissions and discharges (General Accounting Office, 2003; Proudlove et al., 2003).
 - Institute discharge planning rounds (Frank, 2001).
 - Dedicate a position to expedite admissions, discharges and transfers (Cameron et al., 2002; Frank, 2001; Hospital Association of Southern California, 2002; Proudlove et al., 2003).
 - Treat and transfer to other facilities (Proudlove et al., 2003).
 - Establish mechanism to facilitate transfers between acute care hospitals and skilled nursing facilities (Barthell et al., 2003; Cameron et al., 2002; McManus, 2001).
 - Facilitate transfers for aged care and rehabilitation (Cameron et al., 2002; Estey et al., 2003; Vasilakis, 2001).
 - Create admission area/center (Canadian Association of Emergency Physicians and the National Emergency Nurses Affiliation, 2003).
 - Create patient discharge holding area or discharge lounge (Canadian Association of Emergency Physicians and the Emergency Nurses Affiliation, 2003; Hospital Association of Southern California, 2002; Proudlove et al., 2003).
 - Open temporary beds when occupancy reaches 90% (Canadian Association of Emergency Physicians and the Emergency Nurses Affiliation, 2003; Forster et al., 2003).
 - Institute daily quota beds, determine number of average admissions, and keep this number of beds open for anticipated ED admits (Canadian Association of Emergency Physicians and the Emergency Nurses Affiliation, 2003).
 - Use models to predict bed needs (Bagust et al., 1999; Harper, 2002; Jones et al., 2002).
 - Use models to determine allocation of beds across specialties (Huang, 1998).
 - Review hospital high census procedures (Hospital Association of Southern California, 2002).
 - Establish nurse-led discharge and system where each patient is assigned a discharge status (Proudlove et al., 2003).
 - Provide estimated LOS at time of patient admission (Canadian Association of Emergency Physicians and the Emergency Nurses Affiliation, 2003).
 - Establish LOS targets by benchmarking for key case mix groups (Canadian Association of Emergency Physicians and the Emergency Nurses Affiliation, 2003).
 - Use care pathways (Proudlove et al., 2003).
 - Develop actions to improve efficiency of elective cases and surgical theater utilization (Cameron et al., 2002).

authors were unable to determine which specific interventions made a difference. ED staff stress (Estey, Ness, Saunders, Alibhai, & Bear, 2003) was identified as an outcome of EDC cause by the staff's inability to achieve desired standards of care.

Output research

One common strategy to alleviate EDC is to discharge inpatients earlier. While this practice may create a bed today, it may foster increased EDC in the future. Baer, Paternack, and Zwemer (2001) found that ED care of returns is more resource intensive than average ED patients; and they are more likely to be admitted, which contributes to EDC. Additional studies are needed to determine if early discharge increases ED returns and readmissions or if this percentage is consistent based on the volume and diversity of patients treated in an inpatient setting, for example, no differences between early or regular discharge times.

Referral of nonacute patients to another location has also been a common suggestion to decrease ED visits. Grumbach, Keane, and Bindman (1993) suggested that nearly half of patients in the ED cited access barriers to primary care as the reason for ED use. They found that many were willing and their condition was appropriate to be seen the next day in a primary care setting, if primary care services could be made available for lower-income populations. Luo, Liu, Frush, and Hey (2003) found no significant difference between patients with no insurance, private, or public status and overall ED use or use of ED for nonurgent problems in children. Weber, Showstack, Hunt, Colby, and Callahan (2002) found that the majority of ED patients have insurance and an established source of care and suggest strategies be explored as to why they are choosing the ED over their usual care source. Birnbaum, Gallagher, Utkewicz, Gennis, and Carter (1994) found that 1.1% of a sample of 534 patients who met criteria for refusal to care were admitted. Without better guidelines on which patients to refer, they didn't recommend this approach. Washington, Stevens, Shekelle, Henneman, and Brook (2002) conducted a randomized controlled trial deferring 156 adults to a primary care center. While not significant, the deferred group reported less improvement in health status, days in bed, or with a disability than the group cared for in the ED. The authors concluded that standardized screen criteria could be safely used to refer patients for next day

care. Larson (2002) agreed that this strategy is better than the current system where patients self-select themselves out when they leave prior to treatment, but he wonders of the impact on the patients who came to the ED to be told to return tomorrow. Schull et al. (2003) suggested that reducing the volume of walk-in patients is not likely to decrease diversion hours. Additional studies on patient outcomes and impact on EDC should be performed along with patient satisfaction with this approach before this can be recommended as an effective strategy to help decrease EDC. The other issue identified by Grumbach et al. (1993) is having a place to refer these patients. It is one thing to identify who could be referred safely; it is another to find an appointment for them, especially if they do not have a primary care provider, are on Medicare, or uninsured.

Forster et al. (2003) found that ED LOS increases extensively when hospital occupancy exceeds 90% and recommends increasing hospital bed availability to decrease EDC. When hospital occupancy increased 10%, the average ED LOS increased by 18 minutes, which for the average 30 patients admitted each day means an extra 9 hours of ED patient care time and space occupied per day (Forster et al., 2003). Obviously boarding of patients in the ED increases the nursing care resources needed to provide patient care. Huang (1998) used Operational Research strategies successfully to determine size of a new medical assessment unit and how to allocate beds across specialties to minimize inpatient bed delay problems.

Cameron, Scown, and Campbell (2002) found that a clinician-led multidisciplinary team was effective in decreasing EDC by implementing selected improvements from a Government sponsored Patient Management Taskforce. There were 51 tasks that addressed all categories of input-throughput-output. They received funding of \$10.44 million and the main components were implemented in 3 months (Cameron et al., 2002). Primarily, research has focused on resolving throughput and output issues. Additional studies are needed on these two areas and the input category.

Action agenda

EDC is a ticking time bomb. Eventually there will either be front page news of the death of a famous person related to EDC or enough deaths that EDC becomes the lead program for *60 Minutes*. Emergency nurses alone cannot

solve this problem. Nursing must form coalitions within nursing and with others to seek resolution of this complex problem. The first need is for more data to better understand causes, outcomes, and impact of interventions. Yoon, Steiner, and Reinhardt (2003), after manual collection of data to identify factors that influence LOS, recommended improved information systems to collect data for analysis.

This is a call to all nurses to work with health care colleagues to make EDC a priority. EDC should be on the agenda of every hospital and community where it occurs. Multidisciplinary teams should analyze the problem, try solutions, and measure the impact.

EDC should be on the political action agenda of every nursing professional association. Professional nursing organizations can help by educating their members on EDC and each nurse's role in preventing its occurrence. They could also sponsor collaborative grants to study EDC outcomes and effectiveness of interventions.

Nursing can collaborate with other disciplines to put EDC on the national agenda. The Institute of Medicine can be asked to study this patient safety issue. Professional associations could sponsor a multidisciplinary planning task force to develop strategies for implementation at the local, state, and national levels, including tools for evaluating EDC and the impact of interventions.

Data can be used to help convert priorities from profits to quality care. As a multifaceted problem, EDC will require multifaceted solutions. Strategies at the hospital, community, and national levels are needed.

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